Mech recently visited the Navy's senior greenshirt—Assistant Commander for Logistics, RDML Michael Bachmann—to check on the Navy's progress in developing "smart" aircraft systems and to review their potential safety benefits.

"The Future Actually Is Here"

By Dan Steber

Those were RDML Mike Bachmann's first words when asked when the Navy would field MFOQA and maintenance-diagnostic systems, like those tested with FA-18 Automated Maintenance Environment (AME), H-60 Integrated Maintenance-Diagnostics Systems (IMDS), Joint Advanced Health-and-Usage Monitoring Systems (JAHUMS), and Joint Strike Fighter (JSF). The Navy already has progressed toward diagnostic and replay tools, and the Star Wars generation will see more dramatic changes as naval aviation progresses into the 21st century.

Bob Dylan wrote, "The times they are a-changin'," and RDML Bachmann outlined several maintenance and flight operation programs that show the dramatic transformation the Navy and Marine Corps already have made and see in the future. For example, we will have onboard sensors and recorders that capture many different types of maintenance and operational data. That information will be sent back to base via datalink *[early demos have used Link-16 to move data off the aircraft]*. Maintainers will be aware of airborne equipment problems. NALCOMIS will have a gripe generated, and IETMS can be opened to the correct repair or troubleshooting pages…all before a pilot lands.

Once on deck, aviators then will be able to replay critical moments in a sortie and will be able to critique any part of that flight. Should maintainers want to see how the aircraft and systems behaved, they both can sit and watch the "tape."

RDML Bachmann mentioned that integrated maintenance diagnostics testing on Hornets dates back to 1994. "Although it's been 10 years, we've been marching down that path. This work will facilitate and improve the support of these programs. It will increase sortie generation and will allow maintainers to be on deck with the necessary tools and equipment when the aircraft returns for a fast turnaround."

I asked the admiral if he is concerned about reliability problems with the IMDS/JAHUMS recorders. After all, no maintainer wants to spend time chasing "gremlins." "Program managers gauge reliability by looking at trends, doing cost analysis, and using modeling and reliability projections," he said. "We pay close attention to that potential problem." He went on to explain the fleet's participation in the Initial Operational Capability and Supportability Review (IOCSR) process, which includes "program folks," OPNAV N78 and N43, NAVICP, and fleet TYCOM reps (N42 and N421).

The conversation moved toward logistics, and the admiral said, "We make sure that all the integrated logistics support (ILS) items are in place before the equipment is released to the fleet." The combined efforts to identify reliability issues, solve them, and ensure logistics integrity should put maintainer doubts at ease. He spoke about the Joint Helmet-Mounted Cueing System (JHMCS) that went through the IOCSR process and required changes because it couldn't meet the required logistics hurdles. The admi-

ral added, "We use that process *[verifying a program's integrity]* to enforce change."

RDML Bachmann went on to explain the ILS process in fielding such a program. "We have to factor items such as system reliability on the flight-hour program. Collectively, these steps and our ILS efforts force manufacturers to work on improving reliability." He declared, "We will not let a product go out of here that is not ready for use in the fleet!"

How will these programs make a Sailor or Marine's life easier, better, cleaner, or safer? RDML Bachmann explained that the integration of onboard sensors, maintenance diagnostics, data downlink, advanced notification of discrepancies, and electronic media will work to reduce maintenance requirements. They also will provide warnings of critical failure and will give a post-flight review of data collected in flight, allowing us to refine the maintenance process. "Anytime we can reduce maintenance actions, we reduce risk and improve safety," he said. "This technology exists, but, with some people, it will require a paradigm shift." He added that a training advantage is available. "No longer will we have to haphazardly change boxes to look for a problem. We won't waste time and effort hunting for solutions." He explained that these programs should reduce the number of skill-based errors because onboard diagnostics will narrow the hunt for faults and will highlight the maintenance that needs to be done.

Photo by Fred Klinkenberger

RDML Bachmann also discussed MFOQA and its relationship to IMDS, mentioning that commercial airlines have focused on flight-operations quality assurance for years. "MFOQA has been advertised and acknowledged not just for its safety benefits but also from a cost-wise readiness perspective," he said. "It decreases operating and support costs. IMDS and MFOQA complement each other, and both can use the advantage of this new technology."

I asked RDML Bachman to share an experience where MFOQA or IMDS/JAHUMS would have been beneficial earlier in his career. He immediately mentioned vibration analysis on helos when he was assigned to USS *New Orleans* (LPH-11). "Vibe analysis was such a burdensome process," he explained. "I had to obtain NAESU *[now NATEC]* support to get blades balanced. Technology will enable us to make the corrections and minimize the need for tech reps to deploy to a site. It will allow us to save TDY costs because we can ship the data home using a tele-maintenance system."

RDML Bachmann pointed out that these systems have shown great potential, and tests continue to show success. He mentioned the work being done at HSL-41 in San Diego with IMDS/JAHUMS. "Most of the feedback has been positive. Capt. Williamson of PMA-209 says they are prepared for OPEVAL on the SH-60B, and it already has shown value in automating rotor track and balance and vibration-analysis tasks," he offered. "When you have to maintain an aircraft—and it's only one—and they want to fly it, which you typically do about 100 hours a month, you can't afford much down time. They also have seen reduced FCF requirements and have worked to bring in T-700 engine-diagnostics data."

When asked about the most significant benefit of data recorders, he mentioned the replay function. "For example, take an exhaust-gas temperature spike. The maintainer has the ability to see it on replay," he responded. "We didn't even conceptualize that process. But it's a great capability for the maintenance team." I asked him how the integration of these systems could help maintainers, and he said, "It will eliminate excessive troubleshooting, focus the maintainer on the problem, and then have IETMs interface with that data. That approach will give the maintainers clear procedures on how to make the repair."

Thanks to RDML Bachmann and Capt. Gordon Coward (his chief of staff) for taking time to make Mech *readers aware of these promising new programs. I also want to thank Betsy Haley and Rob Koon, NAVAIR PAOs, for their help with this interview.—Ed.*